

Claims

1. A method for improving error correction of concatenated codes, the method comprising the steps of:
 - 5 storing information bits, which form a cuboid information matrix;
 - generating check bits of the cuboid information matrix by an outer code to obtain first code vectors, each first code vector containing a string of adjoining information bits and the check bits, with the cuboid information matrix and the check bits forming a code matrix;
 - 10 cyclically interleaving the information bits and the respective check bits to obtain an interleaved code matrix with second code vectors, wherein the second code vectors of the interleaved code matrix contain only one information bit of each corresponding first code vector; and
 - coding the bits of the interleaved code matrix by an inner code, where at least
15 one of the outer code and the inner code is a three-dimensional product code.
2. A method for improving error correction of concatenated codes as claimed in Claim 1, wherein both the outer and inner codes are three-dimensional product codes.
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3. A method for improving error correction of concatenated codes as claimed in Claim 1, wherein the stored information bits form a cube information matrix.
- 25 4. A method for improving error correction of concatenated codes as claimed in Claim 1, wherein the step of cyclically interleaving the information bits and the respective check bits includes the steps of cyclically shifting the information bits in columns and in rows by different values, and different for each parallel layer having a same orientation of the interleaved code matrix, to obtain the interleaved code matrix,
30 wherein each second code vector of the interleaved code matrix contains only one information bit of each corresponding first code vector.

5. A method for improving error correction of concatenated codes as claimed in Claim 1, wherein the step of cyclically interleaving the information bits and the respective check bits includes the steps of cyclically shifting the information bits and the respective check bits for each parallel layer of the code matrix by different values to obtain a first code matrix, and then shifting one of rows and respective columns of rectangular layers by different values, and different for each rectangular layer, to obtain an interleaved code matrix, wherein each second code vector of the interleaved code matrix contains only one information bit of each corresponding first code vector.

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6. A method for improving error correction of concatenated codes as claimed in Claim 1, wherein a number of shift positions is altered by 1 from one row to a next row, from one column to a next column, and from one layer to a next layer.

15 7. A method for improving error correction of concatenated codes as claimed in Claim 1, the method further comprising the steps of:

decoding the interleaved code matrix by an inner code;
deinterleaving the code matrix; and
decoding the deinterleaved code matrix by an inner code.

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8. A method for improving error correction of concatenated codes as claimed in Claim 7, wherein an iterative decoding procedure is employed.